



Designation: D4290 – 20

## Standard Test Method for Determining the Leakage Tendencies of Automotive Wheel Bearing Grease Under Accelerated Conditions<sup>1</sup>

This standard is issued under the fixed designation D4290; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope\*

1.1 This test method covers a laboratory procedure for evaluating leakage tendencies of wheel bearing greases when tested under prescribed conditions.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard. The exception is apparatus dimensions, in inches, which are to be regarded as the standard.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.* For specific warning statements, see Section 8.

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

### 2. Referenced Documents

2.1 AFBMA Standard:<sup>2</sup>

AFBMA Standard 19 1974 (ANSI B.3.19-1975)

### 3. Terminology

3.1 *Definitions:*

3.1.1 *lubricant, n*—any material interposed between two surfaces that reduces the friction or wear between them.

3.1.2 *lubricating grease, n*—a semifluid to solid product of a dispersion of a thickener in a liquid lubricant.

3.1.2.1 *Discussion*—The dispersion of the thickener forms a two-phase system and immobilizes the liquid lubricant by

surface tension and other physical forces. Other ingredients are commonly included to impart special properties.

3.1.3 *thickener, n*—in *lubricating grease*, a substance composed of finely-divided particles dispersed in a liquid lubricant to form the product's structure.

3.1.3.1 *Discussion*—The solid thickener can be fibers (such as various metallic soaps) or plates or spheres (such as certain non-soap thickeners) which are insoluble or, at the most, only very slightly soluble in the liquid lubricant. The general requirements are that the solid particles be extremely small, uniformly dispersed, and capable of forming a relatively stable, gel-like structure with the liquid lubricant.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *automotive wheel bearing grease, n*—a lubricating grease specifically formulated to lubricate automotive wheel bearings at relatively high grease temperatures and bearing speeds.

3.2.2 *leakage, n*—of *wheel bearing grease*, separation and overflow of grease or oil from the bulk grease charge, induced by high temperatures and bearing rotation.

### 4. Summary of Test Method

4.1 The test grease is distributed in a modified, automobile front wheel hub-spindle-bearings assembly. While the bearings are thrust-loaded to approximately 111 N, the hub is rotated at 1000 rpm and the spindle temperature maintained at 160.0 °C  $\pm$  1.5 °C for 20 h. Leakage of grease or oil, or both, is measured, and the condition of the bearing surface is noted at the end of the test.

### 5. Significance and Use

5.1 This test method differentiates among wheel bearing greases having distinctly different high-temperature leakage characteristics. It is not the equivalent of longtime service tests.

5.2 This test method has proven to be helpful in screening greases with respect to leakage tendencies for automotive wheel bearing applications.

NOTE 1—It is possible for skilled operators to observe changes in grease characteristics that can occur during the test, such as grease condition. Leakage is reported as a quantitative value, whereas the evaluation of grease condition is subject to differences in personal judgment among operators and cannot be used effectively for quantitative measurements.

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee D02.G0.05 on Functional Tests - Temperature.

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<sup>2</sup> Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

\*A Summary of Changes section appears at the end of this standard